CLAIMS

506 AZ) A method of fabricating a bioelectronic component, the method comprising the steps of: a. providing a batch of nanoparticles having submicron sizes and a se-3 lected electrical characteristic; b. attaching at least one biological material to the nanoparticles so as to 5 form shells of the biological material therearound; 6 c. depositing the nanoparticles onto a surface; and 7 d. associating the deposited nanoparticles with at least one electrical 8 contact to facilitate an electrical measurement thereof, the electrical 9 measurement being affected by the biological material. 10 2. The method of claim 1 in which the nanoparticles associate with said 1 electrical contact by means of self-assembly. 2

- The method of claim 1 in which the nanoparticles associate with said 3. 1 electrical contact by mean's of electrostatic assembly. 2
- The method of claim 1 wherein the nanoparticles are semiconductive. 4. 1
- The method of claim 1 wherein the nanoparticles are conductive. 5. 1

- 6. The method of claim 1 wherein the nanoparticles, surrounded by the bio-1
- logical material, collectively act as an insulator. 2

The method of claim 1 wherein the component is a transistor.

- 8. The method of claim 1 repeated at a plurality of locations on a substrate to
- form an array of bioelectronic components. 2

- The method of claim 1 further comprising the steps of:
 - e. providing a second batch of nanoparticles having submicron sizes and
- a selected electrical characteristic;
- f. depositing the second-batch nanoparticles onto a surface; and
- g. sintering the second-batch nanoparticles to form a continuous, uniform
- layer exhibiting the second-batch selected electrical characteristic, the layer
- having a surface, the nanoparticles surrounded by the biological material being
- deposited onto the layer surface.
- 10. The method of claim 9 further comprising the step of forming the electrical 1
- contacts according to steps comprising: 2
- h. providing a third\batch of electrically conductive nanoparticles having 3
- submicron sizes: 4
- i. depositing the third patch nanoparticles in contact with the layer derived 5
- from the second-batch nanoparticles; and 6

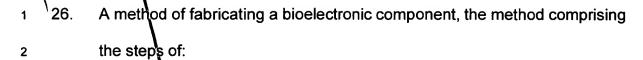
- j. sintering the third-batch nanoparticles to form the contacts, the contacts
 being in contact with the nanoparticles surrounded by the biological
 material following deposition thereof.
- 1 11. The method of claim 10 further comprising the steps of repeating steps
- 2 (a)-(j) at a plurality of locations on a substrate to form an array of bioelectronic
- 3 components.
- 1 12. The method of claim 1 wherein the biological material comprises at least
- 2 one nucleic acid.
- 1 13. The method of claim 1 wherein the biological material comprises at least
- 2 one protein.
- 1 \dagged4. A method of fabricating a bioelectronic component, the method comprising
- 2 the steps of:
- a. providing a batch of nanoparticles having submicron sizes and a se-
- 4 lected electrical characteristic;
- b. attaching at least one biological material to the nanoparticles so as to
- form shells of the biological material therearound, the surrounded
- 7 nanoparticles having an average size;
- 8 c. providing a pair of electrical contacts spaced apart to accommodate one
- 9 or more nanoparticles; and

- d. causing one or more surrounded nanoparticles to be disposed between and bridge the contacts.
- 1 15. The method of claim 14 in which said nanoparticle disposed between
- 2 electrodes is realized by self-assembly.
- 1 16. The method of claim 14 in which said nanoparticle disposed between
- 2 electrodes is realized by electrostatic assembly.
- 1 17. The method of claim 14 wherein the component is a single-electron tran-
- 2 sistor.
- 1 18. The method of claim 14 repeated at a plurality of locations on a substrate
- to form an array of bioelectronic components.
- 1 19. The method of claim 14 wherein the device is formed according to steps
- 2 comprising:
- a. providing a batch of electrically conductive nanoparticles dispersed in a
- 4 carrier medium and having submicron sizes; and
- b. applying an electric field to the dispersion so as to form a chain of
- 6 nanoparticles.

- 1 20. The method of claim 14 wherein the biological material comprises at least
- 2 one nucleic acid.
- 1 21. The method of claim 14 wherein the biological material comprises at least
- 2 one protein.
- 1 22. A bioelectronic component fabricated in accordance with claim 1.
- 1 23. A bioelectronic component fabricated in accordance with claim 14.
- 1 \24. A method of fabricating a bioelectronic component, the method comprising
- 2 the steps of:
- a. providing a batch of nanoparticles having submicron sizes and a se-
- 4 lected electrical characteristic;
- b. attaching at least one biological material to the nanoparticles so as to
- form shells of the biological material therearound;
- 7 c. depositing the nanoparticles onto a surface; and
- d. associating the deposited nanoparticles with at least one electrical
- 9 contact to facilitate the electrical control of said biological material.
- 1 25. The method of claim 24 repeated at a plurality of locations on a substrate
- to form an array of bioelectronic components.

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- a. providing a batch of nanoparticles having submicron sizes and a selected electrical characteristic;
 - b. depositing the nanoparticles onto a surface;
- c. sintering the batch of nanoparticles to form at least one layer of an electrical device; and
- d. associating a biological material with at least one layer of said electrical device to facilitate an electrical measurement thereof, the electrical measurement being affected by the biological material.
- 1 27. The method of claim 26 repeated at a plurality of locations on a substrate
- 2 to form an array of bioelectronic component.
 - 28. The method of claim 26 in which said electrical device is a transistor.
 - 29. The method of claim 26 in which said electrical device is a microelectromechanical device.
- 1 30. The method of claim 26 in which said device is a microfluidic device.